LHD JUAN CARLOS I

The construction context of the "**LHD Juan Carlos I"** is held in a time when Spain began to assume greater international responsibilities and budget growing because of the National improved economy. Given the international agreements and their increasing, Spain needed to deploy to ever more distant scenarios with greater autonomy, in addition to being compatible to the Army assets.

The project to build "**LHD Juan Carlos I"** began in 2002 by the EMA (Estado Mayor de la Armada/Staff of the Navy), and by issuing a document that defined the necessity of building a ship with strategic projection capabilities that could deploy forces, from Marines or Army. By the following year contract specifications were drawn up in 2004 with the execution order, which was signed to Navantia.

"LHD Juan Carlos I" was built at Navantia shipyard in Ferrol (La Coruña, Spain), prepared with modular construction technique. During the first month of 2005 was cut the first metal panel and after that, in July 2006 was made the first block on the slipway.

Appointed initially as a **Strategic Projection Ship** (BPE), making it clear the role that came in to play in the context of the Navy, finally called LHD (Landing Helicopter Dock), and in addition named like the Head of State "Juan Carlos I", showed up in the context of Spanish Armada to replace Newport class LST ships (Hernán Cortés and Pizarro).

She is the largest ship ever built for the Spanish Navy, and she was designed to enable multipurpose operations both Marine and Army, plus serving as aircraft carrier. For that reason, the ship was designed to primarily four distinct roles. Four concepts of operations for which it was designed are the following:

- Strategic Projection.
- Amphibious Operations.
- Alternative Aircraft Carrier.
- Military Operations Other Than War (MOOTW).

MAIN CHARACTERISTICS - LHD JUAN CARLOS I (L-61)

"LHD Juan Carlos I" has 231 meters of overall length, with beam of 32 meters, just to get through the Panama Canal, with 7 meters of draft. Her displacement is 27.000 tons in amphibious operations and over 24,000 tons with single air component.

"LHD Juan Carlos I" has four main decks plus seven others. Four main decks are, from lower to higher:

- Heavy vehicle garage
- Dining Crew
- Hangar
- Flight deck

- **Deck dock and heavy vehicle garage**. Located in the aft part of the ship, the floodable area is 69.3 x 16.8 meters long with up to 4 LCM-1E and 4 Supercat capacity in two spaces. Also is adapted to operate **LCAC** (Landing Craft Air Cushion). In the forepart is 1480-square-meters heavy vehicles garage. This deck supports 62 tons Leopard combat tanks. Maximum capacity of this deck is 46 Leopard tanks, up to 88 vehicles, or 16 tons of leveraging the dock instead of boats. Stern ramp is also located in this deck for accessing from the dock and where operations are carried out with boats, and two side access doors from the harbor dock to this deck for boarding vehicles. It is also found a ramp for light vehicles up to the hangar/light vehicles deck.
- **Habitability deck**. In this deck are located most of the crew accommodations, hospital facilities, kitchens, dining rooms, different mess and other recreational instances of personnel.
- **Hangar and garage deck for light vehicles**. This continuous deck is divided as required based on both aircraft hangar and garage for light vehicles necessities. Light vehicle area is located in the forepart and it can be stowed vehicles up to 16 tons, aircraft and/or containers up to that weight. The ability to use the whole deck stowage is up to 19 AV-8B Harrier II Plus or F-35B JSF, up to 30 mid-size helicopters, or up to 10 helicopters CH-47D Chinook or a combination of 12 mid-size helicopters and 11 aircraft AV-8B Harrier II Plus. CH-47D helicopters Chinook can be transported alongside this deck with their blades removed. Hangar area has a 1-ton monorail crane, and in the cargo area (port side) there is a bridge crane with 16 tons of capacity.
- **Flight Deck**. The flight deck of the "LHD Juan Carlos I" is 202.3 by 32 meters with a surface of 5,440 square meters. It has a 12 degrees sky-jump at bow-port side to facilitate the launch of STOVL (Short Take Off and Vertical Landing) aircraft. The flight deck allows for both day and night operations and has six SPOT for mid-size or four for larger helicopters (CH -47D Chinook helicopter type), and another aft SPOT heavy reinforced especially for the Bell-Boeing MV-22 Osprey or CH-53 Super Stallion. Aircraft transport from the hangar to the flight deck is delivered with two elevators, one aft, cantilevered bay (13.3 x 11.2 meters), in the style of the aircraft carrier Principe de Asturias and another forward-starboard side of the island (17 x 11.2 meters)

with capacity for just over 27 tons. It has also an ammunition hoist of 2 ton (4.2 x 1.9 meters) which access to the island via an elevator for 2 stretchers communicating with the hospital. It is found, forward of the bow aircraft elevator, a 20-ton crane.

With the purpose of movement of various loads, as well as lifts that have been pointed out, the "**LHD Juan Carlos I"** has a light-load elevator of 20 tons between decks 4th and 1st. A 2-ton lift of ammunition, a 1-ton lift to the hospital, 1 VIP lift, a 2-ton food hoist, and also a 250 kg ramp between Hangar/light vehicles deck and heavy vehicles garage.

"LHD Juan Carlos I" has 2 FAS receiving stations, 1 FAS provider station; and finally a receiving RAS station.

Could not be overlooked that "LHD Juan Carlos I" has a hospital facility, with:

Ambulatory area:

- Consultation Room.
- Treatment room.
- Dentist's office.
- 14 patient beds.

Hospital area:

- Casualty examination area with 6 stretchers.
- Intensive care unit for 8 patients.
- Isolation ward for 4 patients.
- 2 full surgery rooms.
- Sterilization room.
- Laboratory.
- X-ray room.
- Pharmacy.

POWER PLANT- LHD JUAN CARLOS I (L-61)

The propulsion "**LHD Juan Carlos I"** is fully electric and therefore must be considered both power plant and electrical plant as one. The power plant consists of a gas turbine CM-2500 generating 19.750 HP, which differs from the LM-2500 from other Navy ships because this one is not a naval gas turbine, it is a ground gas turbine, as many installed in cogeneration plants; she is also has two Navantia-MAN 32/40 diesel generators of 7.860 HP each drives 6.600 volts power to two main distribution panels. From that line are powered PODs, bow thrusters, and eight 6.600-to-440 volt transformers that feed six distribution centers.

The powerplant falls on two Schottel-Siemens PDO of 11MW power, rotating 360 degrees with two three-bladed propellers each. This gives her a great maneuverability in comparison with axle-line vessels. It has also two transverse thrusters mounted in the bow side, of 1,500 kW each maneuvering in restricted waters.

As emergency power, “LHD Juan Carlos I” has a 1.200 kW diesel generator that feeds 440 V to an electrical panel.

In case of one diesel generator failure there is an 18 knots limitation, and furthermore, in case of turbo generator stoppages that speed is limited to 14 knots. Top speed backwards is 8 knots and maximum speed with single POD is 8 knots as well.

DFM tank capabilities fuel for own consumption is 1649 tons, JP-5 aircraft fuel is 800 tons, drinking water is 479 tons, and DFM fuel for boats and landing force is 500 tons.

With that fuel capacity “LHD Juan Carlos I” has a maximum range of 9,000 nautical miles at 15 knots.

SENSORS AND SYSTEMS - LHD JUAN CARLOS I (L-61)

“LHD Juan Carlos I” has a high degree of nationalization in all systems and sensors. Radars that it has been installed are national, from R&D programs of the Ministry of Defense in collaboration with the company Indra, the unique exception is the navigation radar.

Air radar developed by Indra is based on **Indra/Lanza-N,** which is a naval adaptation of the Lanza radar equipped in many of Air Surveillance Squadron (EVA) of the Spanish Air Force, to provide an effective monitoring of Spanish airspace. It is vertically grouped dimensional radar with flat antenna consisting of a horizontal array of elements, each of which has its own receptor. Main differences with older series are the incorporation of surface target channel detection feature, and the proper size of the antenna, which is much smaller. The radar provides coverage of 180 nautical miles working in the L band.

The Surface Search and Navigation Radar is the **Indra Aries-NAV** with high detection capability of aircrafts located in the foremast under the radar Lanza-N.

In the aft mast is located the Air Search Radar **Indra Aries-SAAS** (Surface and Air Surveillance), that is designed to detect airborne targets and conduct tasks control aircraft. This Aries-SAAS also collects radar capabilities from Aries-NAV.

The aircraft approach radar is the **Aries-PAR**, which consists of two antennas: one for azimuth and another for elevation. This radar is located aft of the island, behind the stern post.

As navigation radar capabilities, “LHD Juan Carlos I” has installed a radar **Northrop Grumman Sperry Marine VisionMaster FT**, which is located forward of the island, over the bridge.

IFF (Identification Friend or Foe) Indra System incorporates 5 and S Modes of operation. The questioner is associated to the Lanza-N radar.

Optronics Surveillance System consists of two stabilized optronic systems developed by Tecnobit Argos. Those are installed at the end of the island to cover aft and bow sides.

Electronic warfare aboard the "LHD Juan Carlos I" is composed of two systems. On the one hand the ESM's Indra Rigel band radar, and in the other hand Indra Regulus' communications system.

As countermeasures she has installed six **Mk-36 SRBOC** with six tubes each. It has two installed aft on each side and two on the bow side. Additionally there are two more on each tack.

The system core is based on the new combat system national **SCOMBA** (**S**istema de **COM**bate de **B**uques de la **A**rmada). This system, result of R&D Defense program, is a fully national development common to all new construction Navy ships which allows homogenization between different units.

The **SCOMBA** consists of two redundant **ARES** processor cabinets acting as system processors, a SD2V video distribution system that drives video signals received from radars and TV equipments (CCTV, FLIR) to the consoles. Whole system is connected through an Ethernet network.

Tactic presentation can be displayed in 18 consoles, two three-monitor consoles (one of them for SCOMBA presentation), two auxiliary consoles; and 16 two-monitor consoles (14 in the OPS Room and two more in the CTA). Furthermore there are two LSD (Large Screen Display) in the OPS Room.

LINPRO system represents Link-11 and Link-16 (in the future) processor, which provides information exchange between Link networks and SCOMBA.

In addition to these systems, "LHD Juan Carlos I" installs a landing craft Link system.

WEAPONS - LHD JUAN CARLOS I (L-61)

The armament of the "LHD Juan Carlos I" is limited to four **Oerlikon** 20/120 mm, and four 12.7mm Browning machine guns. There are also empty spaces for a future close-in weapon defense system, anti-torpedo system and four Mk-38 Mod 2.

CARGO CAPACITY - LHD JUAN CARLOS I (L-61)

"LHD Juan Carlos I" was designed to ensure sustainability to transported forces in ground operations for a period of thirty days, plus twenty days' transit zone and return, that is, 50 days in total.

For this purpose “LHD Juan Carlos I” has several lockers to store both food and spare parts and ammunition for the ship itself as well as for the onboard forces.

The ship has an area of 580 square meters in four ammunition store compartments, eight more for food (beverages, frozen & fresh food, etc) with an area of 650 square meters. It also has different spare stores in 120 square meters, and various multipurpose store compartments with an area of 325 square meters.

HABITABILITY- LHD JUAN CARLOS I (L-61)

“LHD Juan Carlos I” has a capacity accommodation for her crew, air wing, Staff, boats and landing force.

- **Crew**: 247 (29 officers, 40 SPOs/CPOs and 178 other enlisted)
- **Landing force** (1 general, 45 officers, 64 SPOs/CPOs and 780 troop members)
- **Staff** (1 admiral, 44 officers, 32 SPOs/CPOs and 26 other enlisted)
- **Air wing** (41 officers, 60 SPOs/CPOs and 71 other enlisted)
- **Crew boats** (1 officer, 4 SPOs/CPOs and 18 other enlisted)

Those accommodations meet the most advanced standards of habitability in the Spanish Armada, because all enlisted member has recreational areas according to their category. All cabins maintain the higher standards and consistent dimensions which become one of the best of its kind.

Habitability area which is located between the hangar and heavy vehicles deck is composed of main compartments of habitability, almost all the ship crew. The kitchen is the hub from which the different dining rooms are distributed. To optimize space and members of the “LHD Juan Carlos I”, messes from different categories are in the same deck and around the kitchen: there are located the Officer’s mess, CPO/Sergeant mess and Junior mess and landing force’s. As well there can be found recreational spaces.

Leisure compartments are numerous throughout the ship. Both officers and SPOs/CPOs have living room, dining room, reading room, TV, etc. The rest of the crew has several lounge areas in the vicinity of their accommodation.

COMMERCIAL SUCCESS - LHD JUAN CARLOS I (L-61)

The design of the “LHD Juan Carlos I” has been introduced to several contest in various navies with stiff competition, especially with Mistral class, his French counterpart.

The first success came in when Navantia won the contest acquisition of two vessels for the Royal Australian Navy (RAN), based on “LHD Juan Carlos I” model and associated with their Australian partner BAE Systems Australia. In the competition Navantia would be responsible for the design and construction of the superstructure, isolated areas would be built in Australia as well as the supply of engines and SICP (Sistema Integrado de Control de Plataforma/Integrated Control Platform System). The principle differences from Australian LHD class Canberra are sensors and combat system.

In December 2013, the Executive Committee of the Turkish Defence Industry (SSIK) announced the selection of SEDEF Gemi İnşaatı A.Ş, Navantia local partner to start negotiations for the signing of a contract for the construction of a landing ship LHD amphibious type "Juan Carlos I".

Navantia would design the amphibious landing ship which later on became built on Sedef shipyard. As well as the design, Navantia would be responsible for building 4 LCM-1E boats (such as those operating in the Spanish Armada), supply of engines, turbine and SICP (Sistema Integrado de Control de Plataforma/Integrated Platform Management System).